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TRAFFIC SURVEY of Bozeman MONTANA 1948

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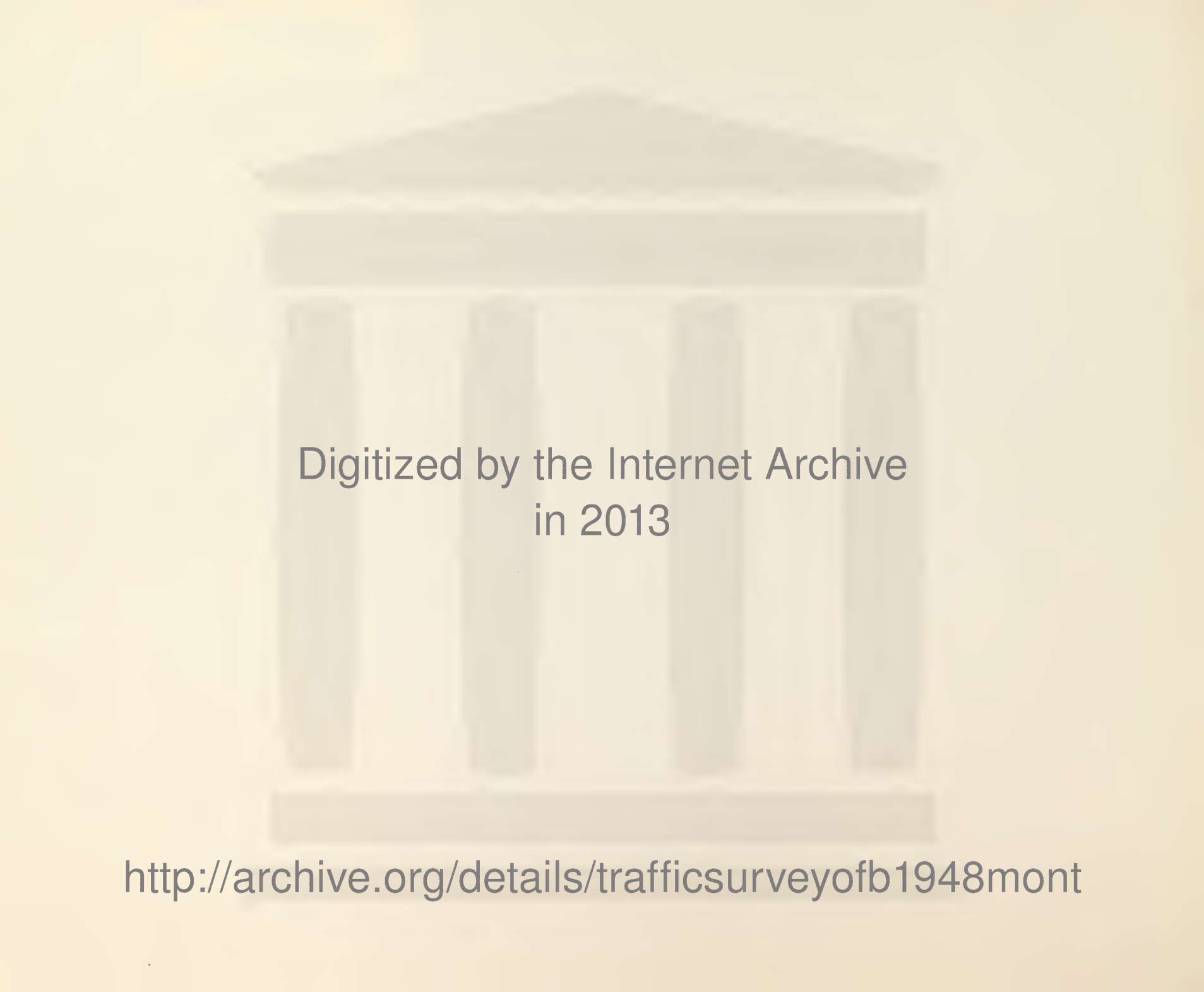
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A TRAFFIC SURVEY
OF
BOZEMAN MONTANA
CONDUCTED BY THE
MONTANA HIGHWAY DEPARTMENT
COOPERATING WITH
THE
CITY OF BOZEMAN

ACKNOWLEDGEMENT

This survey was accomplished through the cooperation of many people. The help given by the motorists and city officials of Bozeman is greatly appreciated.

DEFINITIONS OF TRAFFIC TERMS USED IN THIS REPORT

Origin & Destination Survey – A survey of travel concerned with the locations where trips begin and end and the types of vehicles used.

Origin – The location where a trip begins.

Destination – The location where a trip ends.

External Survey – A type of Origin & Destination Survey wherein trip information is gathered by interviewing drivers at stations located near the city limits on all important highways entering the city.

External Traffic – That traffic which has either its Origin or Destination outside of the city.

Central Business District – That portion of the city which includes the main shopping and business establishments.

Trip – The one way travel from a point of Origin to a point of Destination.

Through Traffic – Those vehicles which did not stop in the city or stopped only for gasoline, food, or other non-essential purposes.

Practical Roadway Capacity - - - - - - - - - - - The maximum number of Vehicles that can pass a given point on a roadway or in a designated lane during one hour without the traffic density being so great as to cause unreasonable delay; hazard or restriction to the drivers freedom of maneuver under the prevailing roadway and traffic conditions.

BOZEMAN TRAFFIC SURVEY

INTRODUCTION AND SURVEY PROCEDURE

At the request of the City of Bozeman in July, 1948, the Montana Highway Commission authorized a limited traffic survey within the urban area of the city. The two-fold object of this survey was to determine traffic volumes on the more important streets and to investigate the feasibility of a by-pass north of the business district between US 10 east and west. An agreement was reached with the City whereby they shared in the cost of the survey and furnished the personnel required to operate three external origin and destination stations under the supervision of the Montana Highway Department. Field work began on August 15.

Manual counts were taken at 65 intersections on the main streets of the City and two portable counters were operated continuously in the business district while the survey was in progress. These continuous counts provided the necessary factors used in expanding the eight hour manual counts to a 24-hour basis.

While the traffic counting was in progress, three external interview stations were established near the city limits on US 10 and US 191. These three stations were each operated for sixteen hours from 6 A. M. - 10 P. M. on alternate week days. Interviewing of all outbound motorists began on August 25 and was concluded September 5. This activity yielded 2775 useable interviews representing 38.7% of all traffic passing

the external stations during the hours of the survey. Portable counters were operated at each station for at least 48 hours to provide direct expansion factors for the interviews.

Bozeman was divided into seventeen zones for the purpose of indentifying the origin or destination of trips within the area. For a more detailed analysis, the central business and warehouse districts were further divided into smaller sub-zones which were then later combined.

In order to make possible the use of machine tabulating equipment, each interview was translated into a numerical code and all interviews were then processed and tabulated by IBM Machines. From the various tabulations, flow charts used in this report were prepared.

BOZEMAN TRAFFIC SURVEY

SUMMARY AND RECOMMENDATIONS

This report of a limited traffic study made of Bozeman graphically portrays traffic volumes in the city and the desires of the motorists entering the area. It should provide the ground work for any plans for new highway facilities or improvements on those existing, but does not attempt to specifically locate needed improvements.

Bozeman's main traffic problem is the comparatively high concentration of trucks on US 10 through the central business district, which tends to slow down traffic and generally create congestion on a street now handling a near capacity traffic load.

The city has attempted to relieve the congestion caused by the heavy trucks by establishing a truck route on Mendenhall Street one block north of US 10. This route from North Seventh Street on the west to Broadway on the east has proven very unsatisfactory as a truck by pass due largely to the fact that the maximum width between curbs is forty feet and for two blocks on the east the curb to curb width is only 32 feet. Parallel curb parking is permitted on both sides thus reducing the free width to approximately 16 feet minimum which is obviously too narrow for a truck route. In addition to the limited width of Mendenhall Street all traffic using this route is forced to make three sharp right angle turns - two of them across heavy traffic on Main and Seventh Streets.

The external origin and destination survey, made by city personnel, points to the need of a by pass north of Main Street between US 10 east and north. Plate 7, page 33, of this report graphically presents the total traffic that could possibly use a route in this general location. Four hundred thirty-two passenger cars and 66 trucks per day did not make any essential stops in the city, and all of these 498 vehicles would probably use a through route connecting US 10 east and north.

The cost of right of way requirements for this improvement will probably force the location to follow existing streets as much as possible. Peach Street could be used from Seventh to Rouse but from Rouse Street east a thorough investigation should be made of a possible location that would cut southeasterly to an intersection with US 10 near the east city limits. This portion of the route will be difficult to locate due to several railroad spurs that will have to be crossed as well as Bozeman Creek. We believe, however, that any reasonable cost could be justified by the rerouting of the through traffic around the business district.

Bozeman's secondary traffic problem seems to be the poor location of US 191 from Main Street south and west to the west city limits. At present this Federal Aid route enters Bozeman from the west on College Street, turns north on Eighth Avenue directly in front of Montana State College, follows Eighth Avenue to Main Street then turns right on Main Street to intersect US 10 at Seventh and Main. This tortuous route is further

complicated by the fact that Eighth Street is divided into two lanes by a curbed median strip 8 feet wide, planted to lawn. Parallel parking is also permitted on each side thus reducing the useable width of each lane to approximately 10 feet. Most of the heavy traffic between the college and business district uses this route during the college term, and this local traffic, added to the through traffic on US 191, brings the total to approximately 4500 vehicles per day. Due to the narrow useable width of each lane, this volume of traffic is enough to create considerable congestion especially near the college and at the intersection with US 10 on Main Street

One solution for this situation would be the removal of the median strip in the center of Eighth Avenue. This would relieve part of the present congestion but it would not improve the alignment, and should not be considered as more than a temporary expedient.

A permanent solution of this problem would be the relocation of US 191 so that it would enter the city from the west on Main Street, and intersect US 10 at North Seventh Avenue. The present width of Main Street from Eighth Avenue to the west city limits should provide ample right of way for US 191. After leaving the city on the west, a location following a southeasterly course should be investigated so that the present alignment of US 191 can be intersected, as near to the city as is practicable from a location stand point.

This portion of the relocation will traverse irrigated farm lands and the cost of the right of way will therefore be comparatively high. The actual construction should not present any difficulties, however, as the surrounding terrain is quite level and the only structures necessary will be of a minor type over irrigation canals.

In any future highway planning affecting the city of Bozeman we strongly recommend study and further investigation as to location, cost, etc., of the two proposals outlined in this report.

BOZEMAN TRAFFIC SURVEY

GROWTH AND DEVELOPMENT OF BOZEMAN

Bozeman is the oldest city in Gallatin County having continued existance, being formally named August 9, 1864, and being the county seat nearly ever since the creation of the county by the territorial Legislature. On February 13, 1874, the Legislature approved an act authorizing the inhabitants of Bozeman to organize as a corporate body.

The estimated census for the city of Bozeman in 1870, four years before the official incorporation, was 742. During the next ten years there was a moderately slow growth in population to 894 by 1880. This is attributed largely to the fact that during this period the surrounding territory was utilized in cattle and sheep raising, and had not developed the potential possibilities of the rich surrounding farm lands.

During the years to follow, with the influx of permanent settlers, Bozeman has had a steady growth, keeping pace with the farming, timbering, and mining industries that developed the rich territory surrounding this flourishing young city.

On the 16th of February, 1893, Governor John E. Richards signed the act passed by the third Legislative Assembly locating the State College of Agriculture and Mechanical Arts at Bozeman. The State Board of Education met in Bozeman, March 21, 1893, and

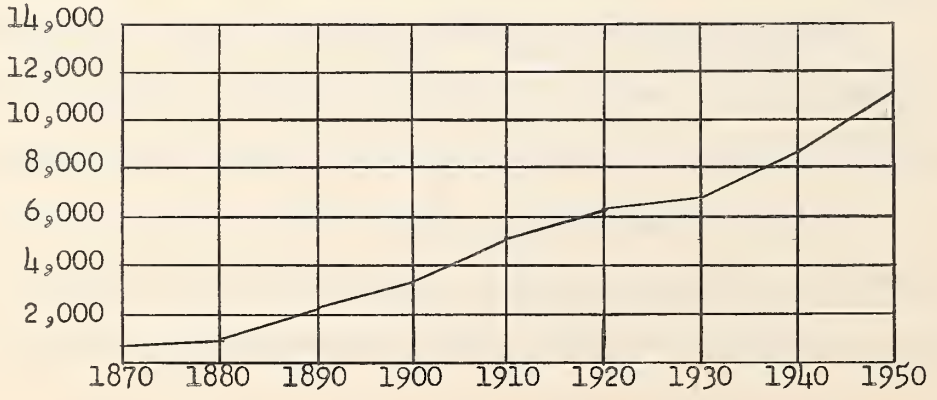
selected the present site for the college campus and experimental farm. The number of students has steadily increased with the material growth of the college from the eight students who enrolled in the spring of 1892, to the 3,218 students enrolled during the school year of 1949 - 1950.

This thriving and expanding city attracted many other enterprises in the metropolitan and adjacent area including: a livestock and farming experimental station, a state fish hatchery, sugar refinery, canneries, a flour mill, and many other industries that enhance and further assure the continued growth of this city.

Today Bozeman, a busy prosperous community, built solidly on an expanding and dependable industry has the background and potential future possibilities to continue to be one of Montana's leading cities.

POPULATION GROWTH

CITY OF BOZEMAN, MONTANA



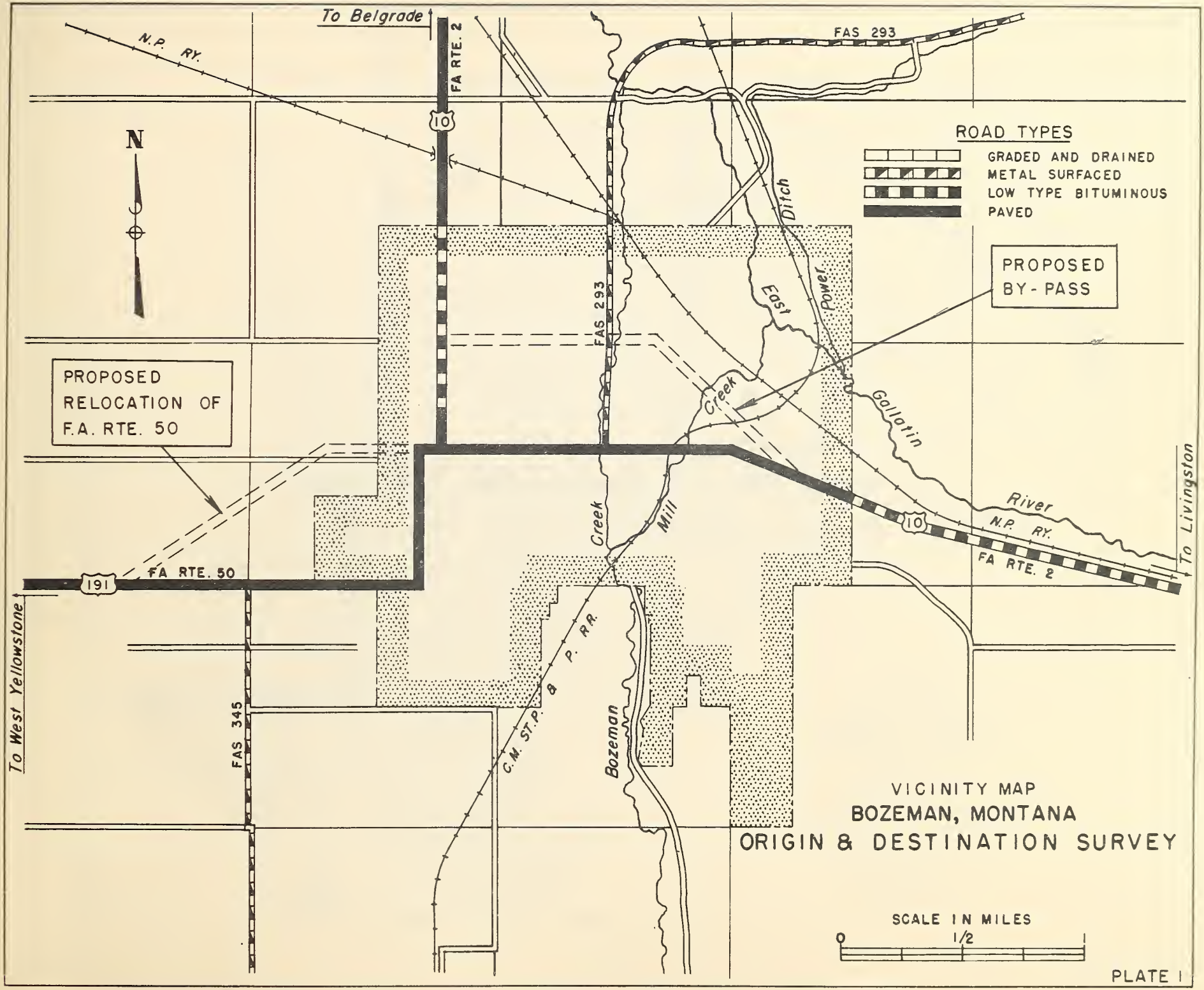
VICINITY MAP

AND

TRAFFIC CHARTS

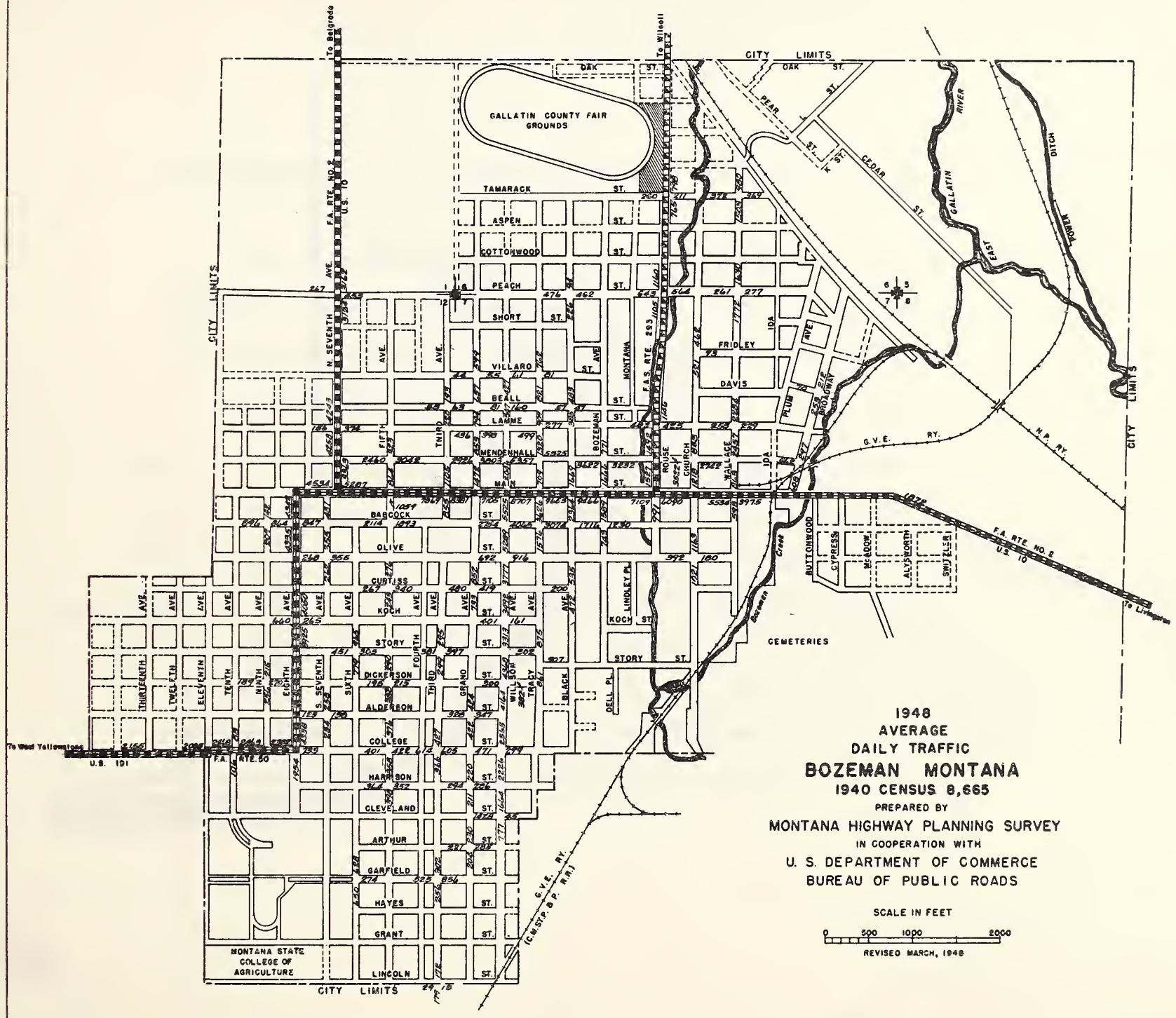
VICINITY MAP

Plate 1 shows the relative location of the main highways entering Bozeman and the locations of the two proposals outlined in the summary.


To Belgrade
N.P. RY.
FA RTE. 2
10
FAS 293
N
ROAD TYPES
GRADED AND DRAINED
METAL SURFACED
LOW TYPE BITUMINOUS
PAVED
PROPOSED BY-PASS
PROPOSED RELOCATION OF F.A. RTE. 50
East Gallatin Power Ditch
Creek
FAS 293
Gallatin River
N.P. RY.
FA RTE. 2
10
To Livingston
Mill Creek
191
FA RTE. 50
To West Yellowstone
FAS 345
C.M. ST.P. & P. RR.
Bozeman
VICINITY MAP
BOZEMAN, MONTANA
ORIGIN & DESTINATION SURVEY
SCALE IN MILES
0
1/2
1
PLATE I

1948 TRAFFIC VOLUMES

Plate 2 shows the traffic volumes on the streets of Bozeman and has been prepared from manual counts taken in August 1948. All figures shown represent an annual 24 - hour average for 1948.



1948
AVERAGE
DAILY TRAFFIC
BOZEMAN MONTANA
1940 CENSUS 8,665
PREPARED BY
MONTANA HIGHWAY PLANNING SURVEY
IN COOPERATION WITH
U. S. DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS
SCALE IN FEET
0 500 1000 2000
REVISED MARCH, 1948
GALLATIN COUNTY FAIR GROUNDS
MONTANA STATE COLLEGE OF AGRICULTURE
CEMETERIES
CITY LIMITS
To Belgrade
To Willcoll
To West Yellowstone
To Livingston
F.A. RTE. NO. 2
U.S. 10
U.S. 191
F.A. RTE. 50
F.A.S. RTE. 293
G.V.E. RY.
N.P. RY.
(C.M.ST.P. & P. R.R.)
GALLATIN RIVER
EAST GALLATIN
POWER DITCH
Bozeman Creek

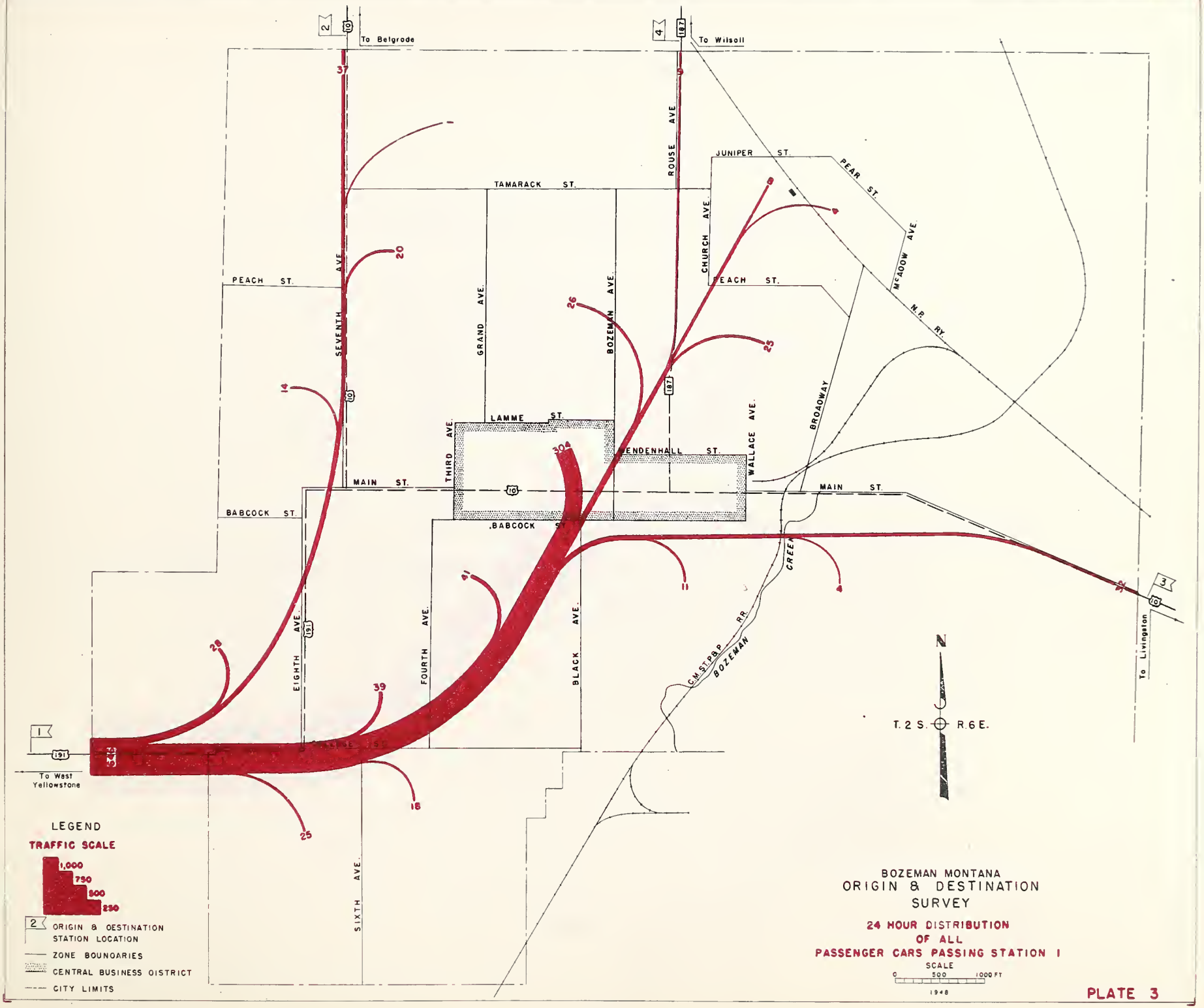
PLATE 2

24 - HOUR DISTRIBUTION OF ALL PASSENGER CAR TRAFFIC PASSING STATION NO. 1

Plate 3 illustrates the distribution to the internal zones and other external stations of all passenger cars passing station No. 1 either entering or leaving the city. All traffic has been adjusted to an annual average for 1948. A summary of station No. 1 follows:

Average daily traffic	646
Percent of total external traffic interviewed	31.2
Percent foreign passenger cars	19.8
Percent to central business district	47.1
Percent through passenger car traffic	12.1

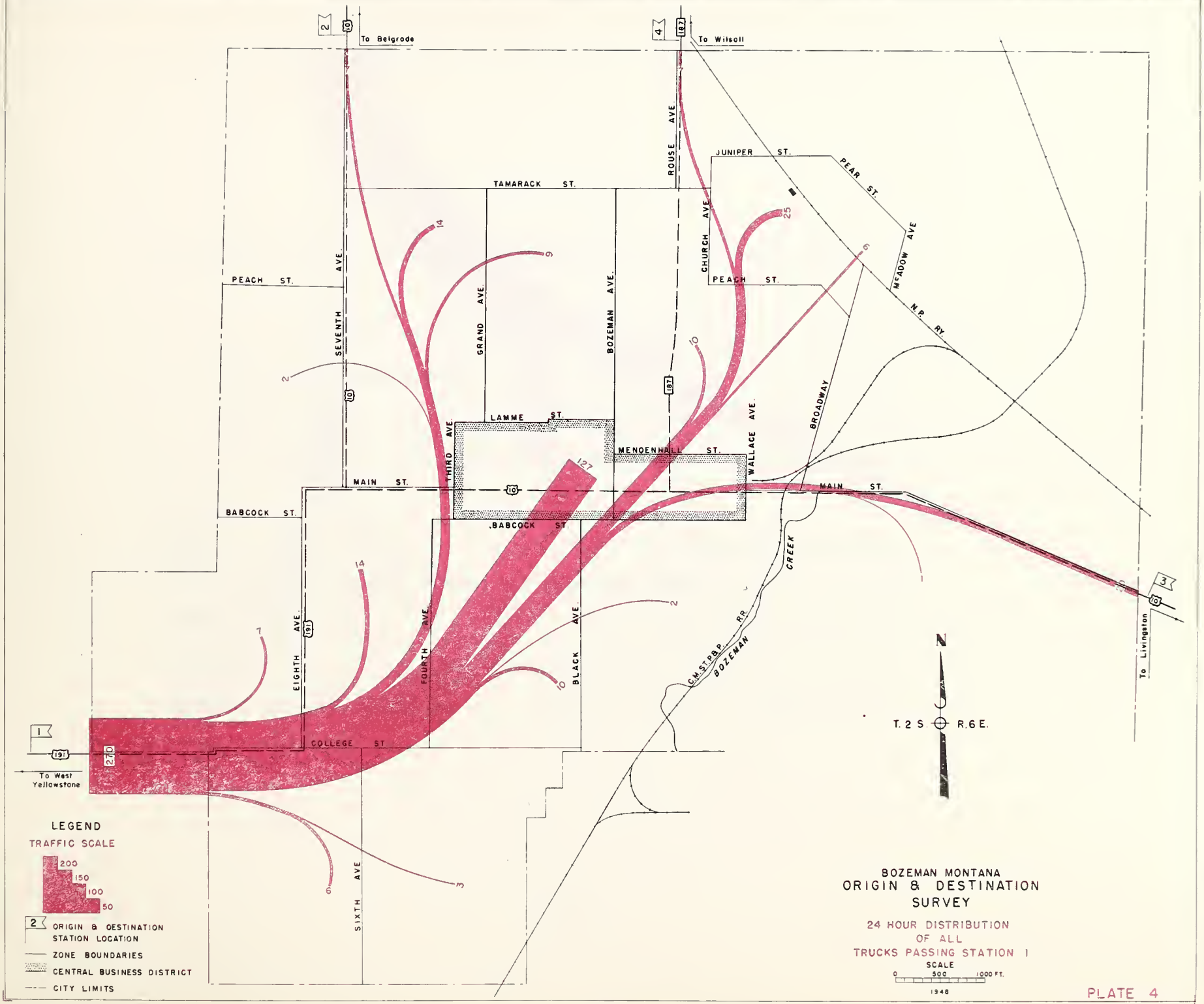
Note Plates 4 to 8 inclusive are similiar to Plate 3. A larger scale has been used, however, on those plates showing the distribution of truck traffic.


To Belgrade
To Wilsall
TAMARACK ST.
JUNIPER ST.
PEAR ST.
PEACH ST.
LAMME ST.
MAIN ST.
BABCOCK ST.
WENDENHALL ST.
SEVENTH AVE.
GRAND AVE.
BOZEMAN AVE.
CHURCH AVE.
ROUSE AVE.
McADOW AVE.
M.P. RY.
BROADWAY
WALLACE AVE.
THIRD AVE.
EIGHTH AVE.
FOURTH AVE.
BLACK AVE.
SIXTH AVE.
C.M.ST.P.&P. RR.
BOZEMAN CREEK
To West Yellowstone
To Livingston
T. 2 S. R. 6 E.
N
LEGEND
TRAFFIC SCALE
1,000
750
500
250
ORIGIN & DESTINATION STATION LOCATION
ZONE BOUNDARIES
CENTRAL BUSINESS DISTRICT
CITY LIMITS
BOZEMAN MONTANA
ORIGIN & DESTINATION SURVEY
24 HOUR DISTRIBUTION OF ALL PASSENGER CARS PASSING STATION 1
SCALE
0 500 1000 FT
1948
PLATE 3

24 - HOUR DISTRIBUTION OF ALL TRUCK TRAFFIC PASSING STATION NO. 1

Plate 4 illustrates the distribution to the internal zones and other external stations of all trucks passing station No. 1 either entering or leaving the city. All truck traffic has been adjusted to an annual average for 1948. A summary of station No. 1 follows:

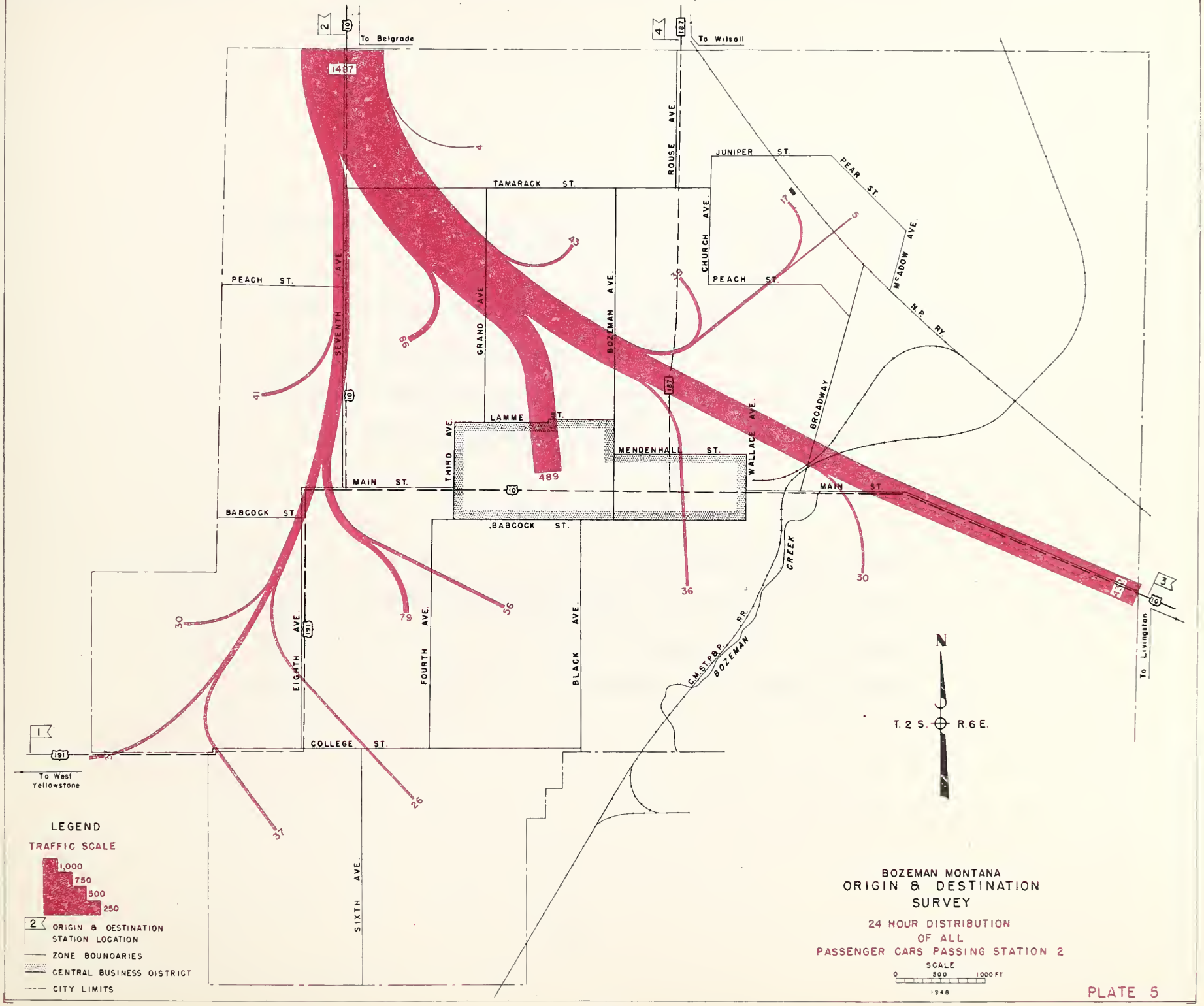
Average daily truck traffic	270
Percent of total external truck traffic interviewed	31.9
Percent to central business district	47.0
Percent through truck traffic	12.6


To Belgrade
To Wilsall
TAMARACK ST.
JUNIPER ST.
PEAR ST.
PEACH ST.
PEACH ST.
LAMME ST.
MENDENHALL ST.
MAIN ST.
MAIN ST.
BABCOCK ST.
BABCOCK ST.
COLLEGE ST.
ROUSE AVE.
CHURCH AVE.
McADOW AVE
N.P. RY.
SEVENTH AVE.
GRAND AVE.
BOZEMAN AVE.
THIRD AVE.
WALLACE AVE.
BROADWAY
EIGHTH AVE.
FOURTH AVE.
BLACK AVE.
SIXTH AVE
CREEK
C.M.ST.P.&P. RR.
BOZEMAN
To West Yellowstone
To Livingston
N
T. 2 S. R. 6 E.
LEGEND
TRAFFIC SCALE
200
150
100
50
ORIGIN & DESTINATION STATION LOCATION
ZONE BOUNDARIES
CENTRAL BUSINESS DISTRICT
CITY LIMITS
BOZEMAN MONTANA
ORIGIN & DESTINATION SURVEY
24 HOUR DISTRIBUTION OF ALL TRUCKS PASSING STATION 1
SCALE
0 500 1000 FT.
1948
PLATE 4

24 - HOUR DISTRIBUTION OF ALL PASSENGER CAR TRAFFIC PASSING STATION NO. 2

Plate 5 illustrates the distribution to the internal zone and other external stations of all passenger cars passing station No. 2 either entering or leaving the city. All traffic has been adjusted to an annual average for 1948. A summary of station No. 2 follows:

Average daily pasenger car traffic	1487
Percent of total external passenger car traffic interviewed	32.1
Percent foreign passenger cars	20.7
Percent to central business district	32.7
Percent through passenger car traffic	31.9


To Belgrade
To Wilsall
1487
ROUSE AVE.
JUNIPER ST.
PEAR ST.
TAMARACK ST.
CHURCH AVE.
McADOW AVE.
N.P. RY.
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SEVENTH AVE.
GRAND AVE.
BOZEMAN AVE.
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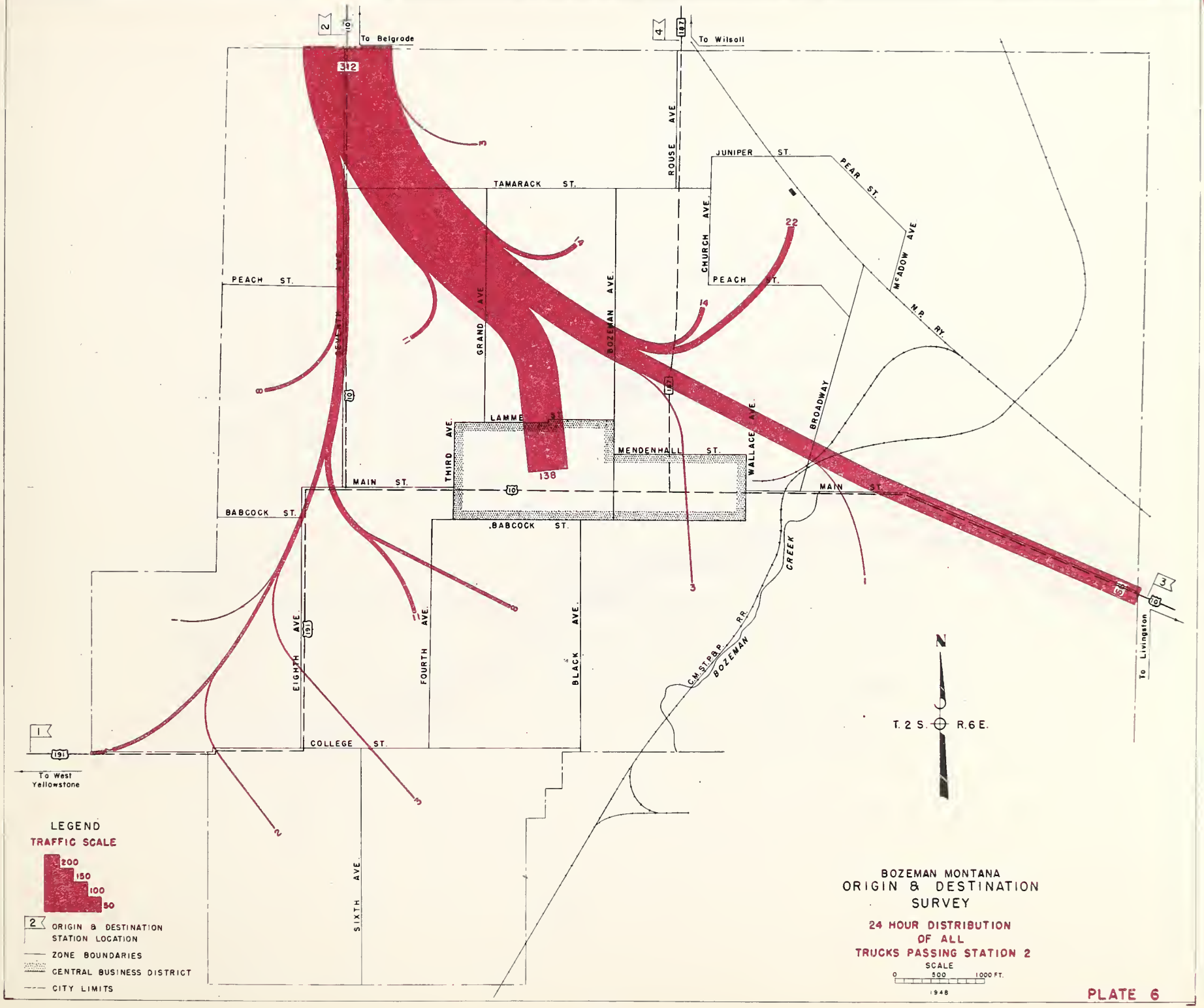
THIRD AVE.
MENDENHALL ST.
WALLACE AVE.
BROADWAY
MAIN ST.
BABCOCK ST.
EIGHTH AVE.
FOURTH AVE.
BLACK AVE.
CREEK
C.M.ST.P.&P. RR.
BOZEMAN
COLLEGE ST.
SIXTH AVE.
To West Yellowstone
To Livingston
T. 2 S. R. 6 E.
N
LEGEND
TRAFFIC SCALE
1,000
750
500
250
ORIGIN & DESTINATION STATION LOCATION
ZONE BOUNDARIES
CENTRAL BUSINESS DISTRICT
CITY LIMITS
BOZEMAN MONTANA
ORIGIN & DESTINATION SURVEY
24 HOUR DISTRIBUTION OF ALL PASSENGER CARS PASSING STATION 2
SCALE
0 500 1000 FT
1948
PLATE 5

24 - HOUR DISTRIBUTION OF ALL TRUCK TRAFFIC PASSING STATION NO. 2

Plate 6 illustrates the distribution to the internal zones and other external stations of all trucks passing station No. 2 either entering or leaving the city. All traffic has been adjusted to an annual average for 1948. A summary of station No. 2 follows:

Average daily truck traffic	312
Percent of total external truck traffic interviewed	25.4
Percent to central business district	44.2
Percent through truck traffic	23.4


To Belgrade
To Wilsall
312
ROUSE AVE
JUNIPER ST.
PEAR ST.
TAMARACK ST.
CHURCH AVE.
McADOW AVE
N.P. RY.
PEACH ST.
PEACH ST.
EIGHTH AVE.
GRAND AVE
BOZEMAN AVE.
LAMME
THIRD AVE.
MENDENHALL ST.
WALLACE AVE.
BROADWAY
MAIN ST.
MAIN ST.
BABCOCK ST.
BABCOCK ST.
138
EIGHTH AVE.
FOURTH AVE.
BLACK AVE.
CREEK
C.M.ST.P.&P. R.R.
BOZEMAN
COLLEGE ST.
To West Yellowstone
To Livingston
SIXTH AVE.
N
T. 2 S. R. 6 E.
LEGEND
TRAFFIC SCALE
200
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100
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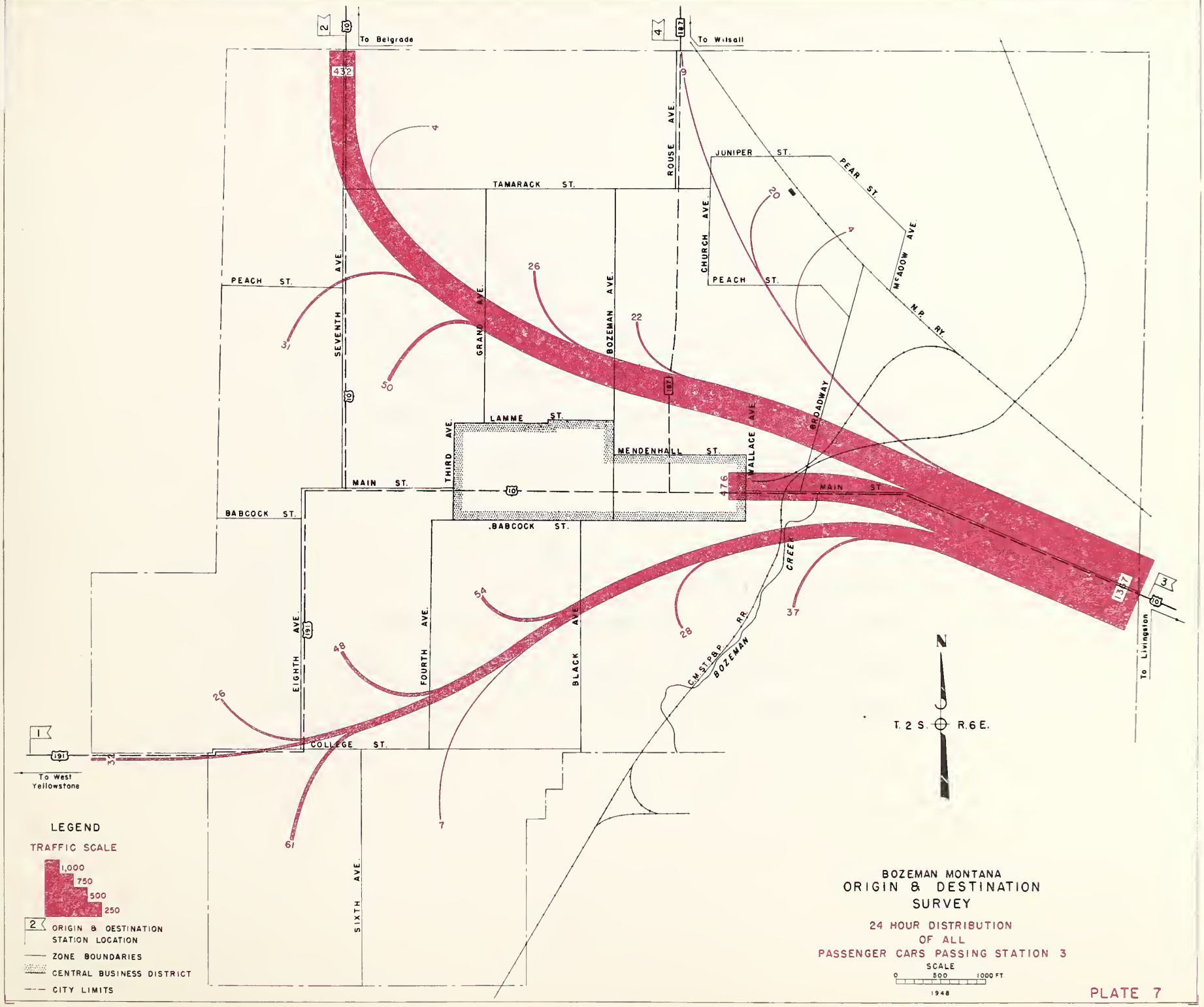
ORIGIN & DESTINATION STATION LOCATION
ZONE BOUNDARIES
CENTRAL BUSINESS DISTRICT
CITY LIMITS
BOZEMAN MONTANA
ORIGIN & DESTINATION
SURVEY
24 HOUR DISTRIBUTION
OF ALL
TRUCKS PASSING STATION 2
SCALE
0 500 1000 FT.
1948
PLATE 6

24 - HOUR DISTRIBUTION OF ALL PASSENGER CAR TRAFFIC PASSING STATION NO. 3

Plate 7 illustrates the distribution to the internal zones and other external stations of all passenger cars passing station No. 3 either entering or leaving the city. All traffic has been adjusted to an annual average for 1948. A summary of station No. 3 follows:

Average daily passenger car traffic	1367
Percent of total external passenger car traffic interviewed	26.6
Percent foreign passenger cars	30.0
Percent to central business district	34.8
Percent through traffic	34.6


To Belgrade
To Wilsall
To West Yellowstone
To Livingston
JUNIPER ST.
PEAR ST.
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BROADWAY
EIGHTH AVE.
FOURTH AVE.
BLACK AVE.
SIXTH AVE.
CREEK
C.M.ST.P.&P. RR.
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T. 2 S. R. 6 E.
LEGEND
TRAFFIC SCALE
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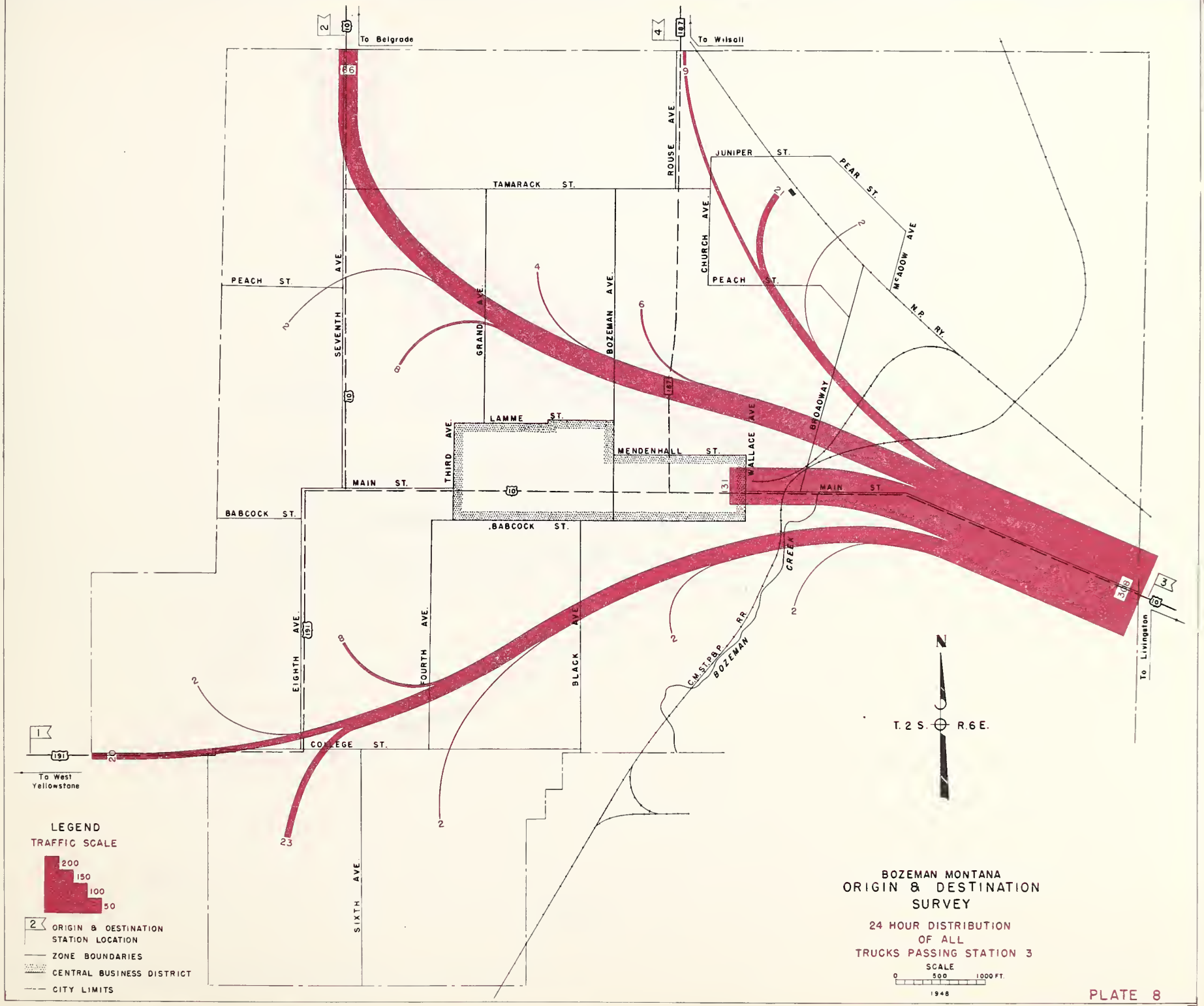
ORIGIN & DESTINATION STATION LOCATION
ZONE BOUNDARIES
CENTRAL BUSINESS DISTRICT
CITY LIMITS
BOZEMAN MONTANA
ORIGIN & DESTINATION SURVEY
24 HOUR DISTRIBUTION OF ALL PASSENGER CARS PASSING STATION 3
SCALE
0 500 1000 FT.
1948
PLATE 7

24 - HOUR DISTRIBUTION OF ALL TRUCK TRAFFIC PASSING STATION NO. 3

Plate 8 illustrates distribution to the internal zones and other external stations of all trucks passing station No. 3 either entering or leaving the city. All traffic has been adjusted to an annual average for 1948. A summary of station No. 3 follows:

Average daily truck traffic	308
Percent of total external truck traffic interviewed	33.9
Percent to central business district	42.5
Percent through traffic	30.8


To Belgrade
To Wilsall
TAMARACK ST.
JUNIPER ST.
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PEACH ST.
MAIN ST.
BABCOCK ST.
COLLEGE ST.
LAMME ST.
MENDENHALL ST.
ROUSE AVE.
CHURCH AVE.
McADOW AVE
N.P. RY.
SEVENTH AVE.
GRAND AVE.
BOZEMAN AVE.
THIRD AVE.
WALLACE AVE
BROADWAY
EIGHTH AVE.
FOURTH AVE.
BLACK AVE.
SIXTH AVE.
CREEK
C.M.ST.P.&P. RR
BOZEMAN
To West Yellowstone
To Livingston
T. 2 S. R. 6 E.
N
LEGEND
TRAFFIC SCALE
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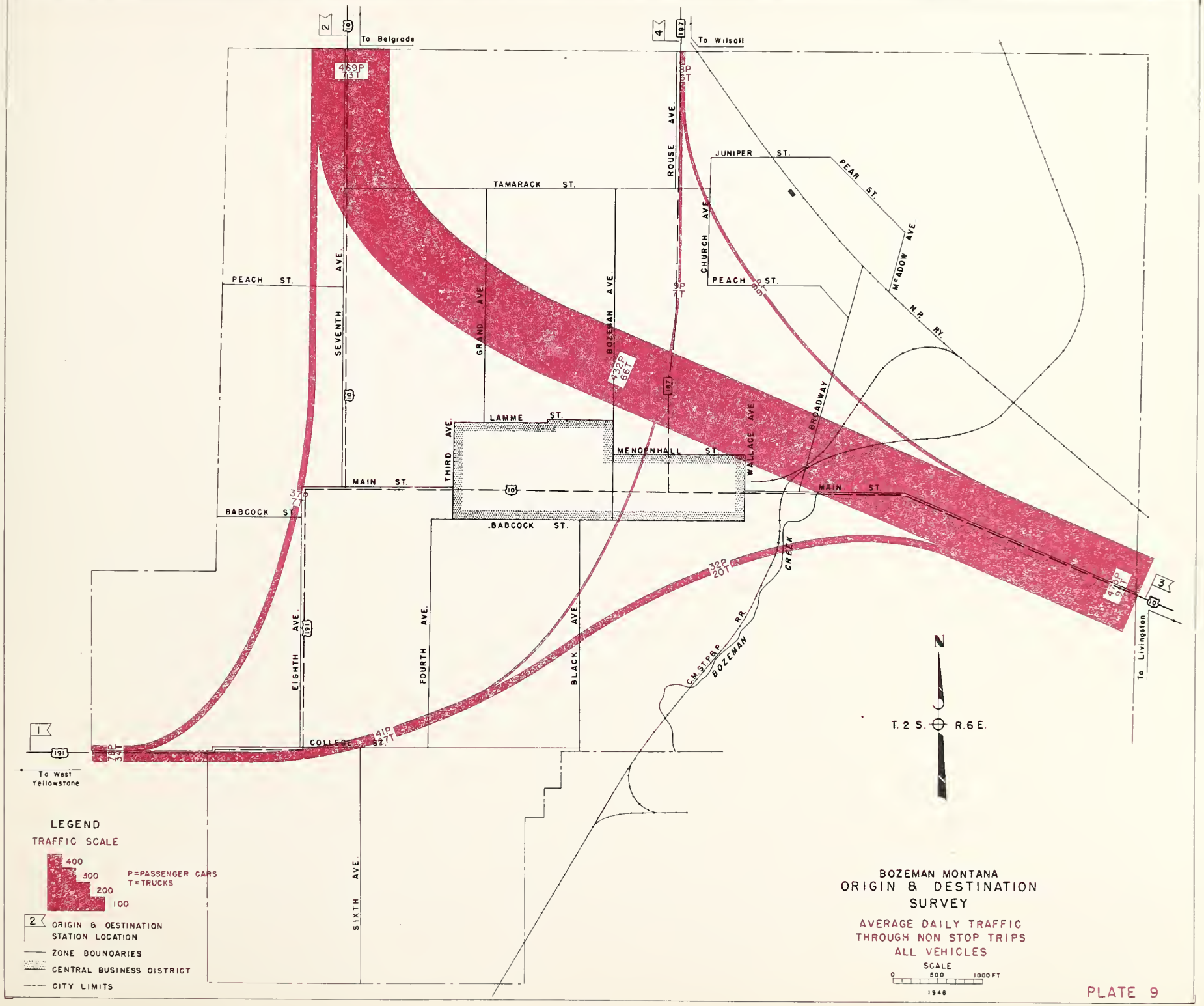
ORIGIN & DESTINATION STATION LOCATION
ZONE BOUNDARIES
CENTRAL BUSINESS DISTRICT
CITY LIMITS
BOZEMAN MONTANA
ORIGIN & DESTINATION SURVEY
24 HOUR DISTRIBUTION OF ALL TRUCKS PASSING STATION 3
SCALE
0 500 1000 FT.
1948

PLATE 8

AVERAGE DAILY TRAFFIC OF THROUGH NON-STOP TRIPS - ALL VEHICLES

Plate 9 illustrates the flow of all non-stop trips through the city of Bozeman during an average day in 1948 and graphically presents the potential traffic that could be by-passed around the city.


To Belgrade
To Wilsall
To Livingston
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TAMARACK ST.
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PEACH ST.
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BABCOCK ST.
LAMME ST.
MENDENHALL ST.
COLLEGE ST.
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BOZEMAN AVE.
ROUSE AVE.
CHURCH AVE.
WALLACE AVE.
BROADWAY
THIRD AVE.
EIGHTH AVE.
FOURTH AVE.
BLACK AVE.
SIXTH AVE.
McADOW AVE.
N.P. RY.
C.M.ST.P.&P. RR.
BOZEMAN CREEK
T. 2 S. R. 6 E.
N
LEGEND
TRAFFIC SCALE
400
300
200
100
P=PASSENGER CARS
T=TRUCKS
ORIGIN & DESTINATION STATION LOCATION
ZONE BOUNDARIES
CENTRAL BUSINESS DISTRICT
CITY LIMITS
BOZEMAN MONTANA
ORIGIN & DESTINATION SURVEY
AVERAGE DAILY TRAFFIC THROUGH NON STOP TRIPS ALL VEHICLES
SCALE
0 500 1000 FT
1948
PLATE 9